

**SOUTHERN UNIVERSITY AND A&M COLLEGE  
DEPARTMENT OF MATHEMATICS**

**MATHEMATICS 140  
PRECALCULUS II (TRIGONOMETRY)**

**Catalog Description:** Topics include exponential, logarithmic, and trigonometric equations and functions; trigonometric identities; right angle trigonometry; Laws of sines and cosines; and DeMoivre's Theorem. Modeling and applications are emphasized. Designed for students in the scientific or engineering programs. Graphing calculators are required.

**Instructor's Emphasis:** Precalculus II (TRIGONOMETRY/Math 140) is designed to provide the student with the essential concepts and skills of trigonometry which are needed for further study in mathematics. Special emphasis is given to the preparation for calculus (Math 264).

**Intended Audience:** This course is designed for students in science, mathematics, engineering, and those who are prospective teachers of mathematics. The purpose is to provide students with the essential concepts and skills in precalculus which are needed to successfully complete a calculus course.

**Course Credit:** Three Hours

**Prerequisites:** MATH 135 with a grade of "C" or better, or by placement.

**TEXTBOOK:** *Algebra and Trigonometry*, Cynthia Young, Wiley 2007.

**Note:** Instructor may require the use of *WileyPlus* online homework management system.

**General Goals:**

1. To provide the student with the knowledge of trigonometry necessary for further study in mathematics.
2. To provide the student with the skills needed to be able to give reasonable explanations, both orally and in writing, of trigonometric concepts encountered.
3. To provide the student with the critical thinking skills required to solve trigonometric problems and then check or verify their solution(s).

**Learning Outcomes:** Upon exiting this course,

1. The student will be able to demonstrate the ability to solve triangles and trigonometric equations by applying appropriate strategies.
2. The student will be able to demonstrate the understanding of trigonometry in the Cartesian plane by applying the reference angle or reference number concept.
3. The student will be able to demonstrate the knowledge of the various trigonometric functions by constructing mathematical models from real world applications.
4. The student will be able to demonstrate the understanding of trigonometric functions by exploring their properties to find the inverse of a trigonometric function when it exists.
5. The student will be able to demonstrate the ability to verify trigonometric identities and use these identities by solving equations and modeling real world problems.

6. The student will be able to demonstrate knowledge of, and competence with, the laws of Sines and Cosines by using the laws to solve approximate triangles.
7. The student will be able to demonstrate knowledge of De Moivre's Theorem by writing the trigonometric representations of complex numbers.
8. The student will be able to demonstrate the ability to use all concepts covered by solving real world application problems.

**Assessment Measures:** Assessment measures include:

1. the departmental comprehensive examination, and
2. instructor created homework, quizzes and examinations.

**Course Contents:**

Unit 1 Trigonometric Functions (Chapter 6)

- 6.1 Angles, Degrees, and Triangles
- 6.2 Definition 1 of Trigonometric Functions: Right Triangle Ratios
- 6.3 Applications of Right Triangle Trigonometry: Solving Right Triangles
- 6.4 Definition 2 of Trigonometric Functions: Cartesian Plane
- 6.5 Trigonometric Functions of Nonacute Angles
- 6.6 Radian Measure and Applications
- 6.7 Definition 3 of Trigonometric Functions: Unit Circle Approach
- 6.8 Graphs of Sine and Cosine Functions
- 6.9 Graphs of Other Trigonometric Functions

Unit 2 Analytic Trigonometry (Chapter 7)

- 7.1 Basic Trigonometric Identities
- 7.2 Verifying Trigonometric Identities
- 7.3 Sum and Difference Identities
- 7.4 Double-Angle Identities
- 7.5 Half-Angle Identities
- 7.6 Product-to-Sum and Sum-to-Product Identities
- 7.7 Inverse Trigonometric Functions
- 7.8 Trigonometric Equations

Unit 3 Additional Topics in Trigonometry (Chapter 8)

- 8.1 Oblique Triangles and the Law of Sines
- 8.2 Law of Cosines
- 8.3 The Area of a Triangle
- 8.4 Vectors
- 8.5 Dot Product
- 8.6 Polar (Trigonometric) Form of Complex Numbers
- 8.7 Products, Quotients, Powers, and Roots of Complex Numbers
- 8.8 Polar Equations and Graphs

## COURSE EXPECTATIONS AND STUDENT SUPPLEMENTS

### 1. EXPECTATIONS

Upon exiting this course, it is EXPECTED that the student will be able to:

- (a) give reasonable explanations, both orally and in writing, of trigonometric concepts encountered;
- (b) solve a given problem and then check its solution;
- (c) utilize basic concepts and skills previously learned to solve problems.

### 2. THE MATHEMATICS LABORATORY (MATH LAB)

The MATH LAB is located in 318 T.T. Allain Hall. The Laboratory will be open for general use and its hours of operation will be posted.

Laboratory resources that are designed to help the student to achieve the objectives of the course include:

- (a) individual tutoring;
- (b) computer algebra software;
- (c) computerized tutoring and practice; and
- (d) internet access to online tutorials.

### 3. OTHER RESOURCES that are designed to help the student achieve the objectives of the course include:

- (a) *WileyPlus* includes a complete online version of the text, algorithmically generated exercises, all of the text supplements, and course and homework management tools.
- (b) Personal tutoring is available free of charge at the Center for Student Success in 107 Stewart Hall. Contact Dr. Jaquator Hamer Lawrence at 771 – 4312 for details.

### 4. CLASS ATTENDANCE

All students enrolled in Math 140 are expected to attend classes regularly and punctually. Excessive absences and tardiness will be noted. The student is responsible for keeping up with course work, whether or not an absence is excused.

- (a) When a student receives THREE absences in Math 140, his/her academic standing in the course will be compromised.
- (b) Extenuating circumstances surrounding tardiness and absences will be handled by individual case.

### 5. EXITING MATH 140

To exit Math 140 the student must have a semester grade of at least a "C". **Those students who earn a grade of "D" or lower must retake and pass Math 140 before advancing to a higher level mathematics course.**

Teachers will administer the EXAMINATION according to the time printed in the *Spring 2008 Class Schedule and Student Registration Bulletin*.

Calculators will be permitted on the proficiency/final examination.

**NOTE:** A graphing calculator may be required by individual instructor for course work. The instructor may use a designated calculator in class. All students are required to know how to use their own calculator.

**ACADEMIC DISHONESTY:** Adhere to honesty and integrity in work submitted for credit in this course and adheres to SUBR's Code of Conduct. (Refer to current Catalog.)

**DISABILITY STATEMENT:** Students that are considered as having a disability are to provide the professor with a letter from the Department of Special Education stating the appropriate accommodations required of this course. If you have a documented disability, then please discuss it with personnel at 771-3950 in Room 125 of Blanks Hall.

**SUGGESTED OR REQUIRED READING:** See professor.

**GRADING POLICY:** See professor.